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QUALITY ASSURANCE SYSTEM FOR RETAIL PHOTOFINISHING

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QUALITY ASSURANCE SYSTEM FOR RETAIL PHOTOFINISHING

FIELD OF THE INVENTION

The present invention is related to photofinishing and more particularly to a system and method for assuring the quality of products and services provided by photofinishers.

BACKGROUND OF THE INVENTION

A retail photofinishing site is a business that has the capability using on-site equipment, such as photofinishing mini-labs, to locally produce photofinishing services directly for a customer. There are currently over one hundred thousand retail photofinishing sites worldwide, and the number is increasing rapidly. A wholesale photofinishing laboratory receives photofinishing orders from a plurality of distributed outlets, such as camera stores, department stores, grocery stores, and drug stores that do not have on-site photofinishing capability, and fulfills the photofinishing orders for the retail outlets. There are currently a few hundred wholesale photofinishers world wide.

Presently, manufacturers of photographic equipment and supplies such as the Eastman Kodak Company license their brand name to wholesale photofinishers. It would be desirable for such manufacturers to leverage their brand identity by licensing the use of their brand name to their retail photofinishing customers. To protect the brand, the level of quality of branded products and services from the retail photofinishers must be controlled. Existing systems employed by photographic manufacturers for assuring quality of the wholesale photofinishers, primarily include manually implemented processes and measures requiring a high degree of personal involvement and contact by representatives of the photographic manufacturer. It is primarily because of the high level of personal interaction required to assure quality, that manufacturer branded output is currently limited to a relatively few large volume wholesale photofinishing laboratories.

Efforts to provide quality control for retail photofinishing sites have concentrated on the chemical processing aspect of the photofinishing

operation. For example one approach to providing quality assurance in a retail photofinisher is the Kodatel™ system wherein manufacturer supplied control materials are processed in the retail site's equipment and measured by a densitometer to produce process control data relating to the chemical processes used at the retail photofinishing site. In this system, there is not necessarily a connection between the manufacturer and the retail site. Since these quality assurance approaches for retail photofinishing sites do not address all aspects of quality experienced by the consumer, it has not been the practice of the industry to license the photographic manufacturers brand to retail photofinishers. There is a need therefore for an improved quality assurance system for retail photofinishing that can enable the broader licensing of the photographic manufacturers' brand name.

SUMMARY OF THE INVENTION

The need is met according to the present invention by providing a quality assurance system for retail photofinishing including a communication network; a retail photofinishing site including photofinishing equipment, a client computer connected to the communication network, and a process monitoring device connected to the computer; and a service center computer located at a service center and connected to the communication network. Client software running on the client computer includes: a quality management application for providing quality information to a manager of the photofinishing site; an operator testing and training application for training and certifying an operator of the retail site and providing testing, training and certification related data to the service center and the quality management application; a quality evaluation application for monitoring the quality of the product and services provided by the photofinishing site and providing quality related data to the service center and the quality management application; a customer feedback application for providing customer feedback information to the quality management application and to the service center; and a process control application for monitoring the condition of the photofinishing equipment at the site and providing process control data to the service center and to the quality management application. Software running on the service center computer, includes an application for collecting storing and

analyzing data from a plurality of photofinishing sites and producing a report on the quality of products and services provided by the sites.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a photofinishing system including a retail photofinishing site and a service center operated by a photographic manufacturer;

Fig. 2 is a block diagram showing the software applications running in the client computer of Fig. 1;

Fig. 3 is a block diagram of the software application running in the service center computer of Fig. 1;

Fig. 4 is a block diagram showing the details of the quality management application running on the client computer of Fig. 2;

Fig. 5 is a block diagram showing the details of the operator training and testing application running on the client computer of Fig. 2;

Fig. 6 is a block diagram showing the details of the color vision portion of the operator training and testing application of Fig. 5;

Fig. 7 is a block diagram showing the details of the operator training and testing portion of the operator training and testing application of Fig. 5;

Fig. 8 is a block diagram showing the details of the quality evaluation application running on the client computer of Fig. 5;

Fig. 9 is a block diagram showing the details of the customer feedback application running on the client computer of Fig. 5;

Fig. 10 is a block diagram showing the details of the process control application running on the client computer of Fig. 5;

Fig. 11 is a block diagram showing the details of the quality evaluation database running on the service center computer of Fig. 3;

Fig. 12 is a block diagram showing the details of the operator training and testing database running on the service center computer of Fig. 3;

Fig. 13 is a block diagram showing the details of the customer feedback database running on the service center computer of Fig. 3; and

Fig. 14 is a block diagram showing the details of the process control results database running on the service center computer of Fig. 3.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 1 a photofinishing system **10** includes a plurality of retail photofinishing sites **12** and a service center **14** connected to a communication network **16** such as phone line, or a virtual private network to reduce telephone costs. The retail photofinishing site **12**, includes photofinishing equipment **18** such as a film processor, printer/paper processor. The photofinishing equipment may also include a film or print scanner for capturing digital images from film or prints, a digital printer for printing the digital images produced by the scanner or from digital images captured by a digital camera.

The retail photofinishing site includes a process monitoring device **20**, such as a densitometer, for making physical measurements on the output of the photofinishing equipment **18**. The measurements are supplied to a computer **22** that runs software applications as described below to assure the quality of the products and services provided by the retail photofinishing site. The computer **22** is connected to a modem **24** for communicating on the communication network **16**.

The service center **14** includes a service center computer **26** and a modem **28** connected to the service center computer **26** for communicating with retail photofinishing sites **12.** The service center computer **26** runs software applications as described below, including remote service applications that cooperate with the software applications at the retail photofinishing sites **12** to facilitate the interaction of the remote support technician **27** with the retail photofinishing sites **12** either by phone or in person, to assure the quality of the products and services provided by the photofinishing sites **12**.

Referring to Fig. 2, the software applications running on the computer **22** at the retail site will now be described. The client computer **22** includes the following applications which are described below: quality management and reporting **30**; operator training and testing **40;** quality evaluation **60**; customer feedback collection **70**; and process control **80**.

Referring to Fig. 3, the software applications running on the service center computer **26** will now be described. The service center computer **26** includes the following applications which are described below: quality evaluation database **100**; operator training and testing database **110**; customer feedback database **120**; and process control database **130**.

Referring to Fig. 4, the Quality management and reporting application **30** of the client computer **22** will now be described. The quality management and reporting application **30** consists of the employee database **31**, the process control database **33**, the customer feedback and contact management database **35**, and the quality results database **38**. The employee database **31** is fed with employee identification information by the retail site manager, and operator training and testing information by the operator training and testing application **40**. The employee database **31** in turn provides training summary reports **32** to the retail site manager and to the operator training and testing database **110** on the service center computer **26** via the client modem **24**, the communications network **16**, and the service center modem **28**. The process control database **33** is fed with process control information by the process control application **80**. The process control database **33** in turn provides process control summary reports **34** to the retail site manager and process control data to the process control results database **130** on the service center computer **26** via the client modem **24**, the communications network **16**, and the service center modem **28**. The customer feedback and contact management database **35** is fed with customer feedback and contact information by the customer feedback application **70**. The customer feedback and contact management database **35** in turn provides customer feedback summary reports **36** and customer contact log reports **37** to the retail site manager and customer feedback data to the customer feedback database **120** on the service center computer **26** via the client modem **24**, the communications network **16**, and the service center modem **28**. The quality results database **38** is fed with quality evaluation information by the quality evaluation application **60**. The quality results database **38** in turn provides quality results summary reports **39** to the retail site manager and quality results information to the quality evaluation database **100**

on the service center computer **26** via the client modem **24**, the communications network **16**, and the service center modem **28**.

Referring to Fig. 5, the operator training and testing application **40** will now be described. The operator training and testing application **40** consists of the color vision test module **42** and the operator training and testing module **50**.

Referring to Fig. 6, the color vision test module **42** of the operator training and testing application **40** will now be described. The color vision test module **42** begins with the entrance of an employee identification by the employee. The color vision test module **42** checks the employee database **31** for the validity of the entered employee identification **43**. If the entered employee identification does not match an employee identification in the employee database **31**, the color vision test module **42** terminates. If the entered employee identification matches an employee identification in the employee database **31**, the color vision test module **42** proceeds with the color vision test **44**. The color vision test **44** consists of a short introduction to possible color vision deficiencies followed by a demonstration to familiarize the employee with the test. The actual test consists of a pre-screening of six different plates followed by a more specific screen of fourteen additional plates if there are incorrect answers in the pre-screen. These plates are modeled after "Ishihara's Tests For Color Blindness" and are designed to show blue-yellow or red-green color vision deficiencies. If the employee does not pass the color vision test **44**, the module informs the employee of the color vision deficiency **45** and terminates. If the employee passes the color vision test **44**, the color vision test module **42** informs the employee **46**, writes the time and date for the pass of the color vision test **44** to the employee identification in the employee database **31** and terminates.

Referring to Fig. 7, the operator training and testing module **50** will now be described. The operator training and testing module **50** consists of the following topics: Understanding Color, Print Grading, Chemical Management, Minilab Maintenance, Customer Delight, Assertiveness, and Retail Selling. The operator training and testing module **50** begins with the entrance of an employee identification by the employee. The operator training and testing module **50** checks the employee database **31** for the validity of the entered employee

identification. If the entered employee identification does not match an employee identification in the employee database **31**, the operator training and testing module **50** terminates. If the entered employee identification matches an employee identification in the employee database **31**, the operator training and testing module **50** offers a choice to the employee to take a pre-test or not. If the employee chooses not to take the pre-test, the operator training and testing module **50** proceeds to offer the employee a list of all training modules **56** and the employee proceeds through each training module **58**. If the employee chooses to take the pre-test, the operator training and testing module **50** administers the pre-test **52**. At the conclusion of the pre-test **52**, if the score is 100% correct, the operator training and testing module **50** checks the employee database **31** for a passed color vision test **44**. If there is a record of a passed color vision test **44**, the operator training and testing module **50** informs the employee and writes the time and date for the pass of the operator training **50** to the employee database **31** and terminates. If there is no record in the employee database **31** of a passed color vision test **44**, the operator training and testing module **50** informs the employee that the color vision test **44** must be passed prior to receiving credit for operator training and terminates. If the pre-test **52** score is less than 100%, the operator training and testing module **50** displays for the employee a list of training modules **54** highlighted with training modules relevant to the missed questions on the pre-test **52** and the employee proceeds through each highlighted training module **58**. At the completion of the training modules **58**, the employee is offered a final test **59**. Prior to the final test **59** being administered, the operator training and testing module **50** checks the employee database **31** for a passed color vision test **44**. If there is no record in the employee database **31** of a passed color vision test **44**, the operator training and testing module **50** informs the employee that the color vision test **44** must be passed prior to taking the final test **59** and terminates. If there is a record of a passed color vision test **44**, the operator training and testing module **50** proceeds to administer the final test **59**. At the conclusion of the final test **59**, if the score is 100%, the operator training and testing module **50** informs the employee and writes the time and date for the pass of the operator training **50** to the employee database **31** and terminates. If the score for the final test **59** is less

than 100% the operator training and testing module **50** displays for the employee a list of training modules **54** highlighted with training modules relevant to the missed questions on the final test **59** and the employee proceeds through the relevant training modules **58**. The employee proceeds in this fashion until the final test **59** is passed. A bookmarking feature in the operator training and testing module **50** allows an employee to exit at any time and upon reentry at a later time, go to directly to the previous exit point.

Referring to Fig. 8, the quality evaluation application **60** will now be described. The quality evaluation application **60** begins with the entrance of an employee identification **61** by the employee. The quality evaluation application **60** checks the employee database **31** for the validity of the entered employee identification. If the entered employee identification does not match an employee identification in the employee database **31**, the quality evaluation application **60** terminates. If the entered employee identification matches an employee identification in the employee database **31**, the quality evaluation application **60** allows the entry of order identification information (twin check number, film type, speed, film brand) **63** by the employee. The quality evaluation application **60** writes this information to the quality results database **38**. The quality evaluation application **60** then asks for input by the employee on photographic quality **64**. If the employee judges that photographic quality is not acceptable, the quality evaluation application **60** collects input from the employee on the type of photographic imperfection **65** and writes this information to the quality results database **38**, and proceeds to ask for input from the employee on physical quality **66**. If the employee judges that photographic quality is acceptable, the quality evaluation application **60** proceeds to ask for input from the employee on physical quality **66**. If the employee judges that physical quality is not acceptable, the quality evaluation application **60** collects input from the employee on the type of physical imperfection **67** and writes this information to the quality results database **38**, and proceeds to ask for input from the employee on clerical quality **68**. If the employee judges that physical quality is acceptable, the quality evaluation application **60** proceeds to ask for input from the employee on clerical quality **68**. If the employee judges that clerical quality is not acceptable, the quality

evaluation application **60** collects input from the employee on the type of clerical imperfection **69** and writes this information to the quality results database **38**, and terminates. If the employee judges that clerical quality is acceptable, the quality evaluation application **60** terminates.

Referring to Fig. 9, the customer feedback application **70** will now be described. The customer feedback application **70** begins with the entrance of an employee identification **71** by the employee. The customer feedback application **70** checks the employee database **31** for the validity of the entered employee identification. If the entered employee identification **71** does not match an employee identification in the employee database **31**, the customer feedback application **70** terminates. If the entered employee identification matches an employee identification in the employee database **31**, the customer feedback application **70** allows the entry of order identification information (twin check number, film type, speed, film brand) **73** by the employee. The customer feedback application **70** writes this information to the customer feedback database **35**. The customer feedback application **70** then asks for input by the employee on the category (photographic, physical, clerical) of the customer complaint **74**. The customer feedback application **70** writes this information to the customer feedback database **35**. The customer feedback application **70** then asks for input by the employee on the resolution (make over all, part, or none of the order) of the customer complaint **75**. The customer feedback application **70** writes this information to the customer feedback database **35**. The customer feedback application **70** then asks for input by the employee on the level of manager follow-up (required or not required) of the customer complaint **76**. If manager follow-up is required, the customer feedback application **70** asks for customer contact information **77** to be input by the employee and writes this information to the customer contact database **37** and terminates. If manager follow-up is not required, the customer feedback application **70** terminates.

Referring to Fig. 10, the process control application **80** will now be described. The employee begins with a processed film control strip **81** or a processed paper control strip **82**. These control strips are measured by the process monitoring device **20** which feeds data into the process control database **83** via the

client computer **22**. The process control application **80** writes this information to the process control database **33**. The process control application **80** compares the entered data with internally stored control limits **84**. If the data is within limits, the process control application returns a go indicator **85** to the operator and writes this information to the process control database **33** of the quality management and reporting application **30** and terminates. If the data is not within limits, the process control application returns a no-go indicator **86** to the operator and writes this information to the process control database **33** of the quality management and reporting application **30** and terminates.

Referring to Fig. 11, the quality evaluation database **100** of the service center computer **26** will now be described. The quality evaluation database **100** receives quality results data from a plurality of quality results databases **38** of the quality management and reporting application **30** running on the client computer **22**. The quality evaluation database **100** produces summary reports **101** and individual retail site reports **103**.

Referring to Fig. 12, the operator training and testing database **110** of the service center computer **26** will now be described. The operator training and testing database **110** receives operator training and testing data from a plurality of employee databases **31** of the quality management and reporting application **30** running on the client computer **22**. The operator training and testing database **110** produces summary reports **111** and individual retail site reports **113**.

Referring to Fig. 13, the customer feedback database **120** of the service center computer **26** will now be described. The customer feedback database **120** receives customer feedback data from a plurality of customer feedback databases **35** of the quality management and reporting application **30** running on the client computer **22**. The customer feedback database **120** produces summary reports **121** and individual retail site reports **123**.

Referring to Fig. 14, the process control results database **130** of the service center computer **26** will now be described. The process control results database **130** receives process control results data from a plurality of process control databases **33** of the quality management and reporting application **30**

running on the client computer **22**. The process control results database **130** produces summary reports **131** and individual retail site reports **133**.

The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

PARTS LIST

10	photofinishing system
12	retail photofinishing site
14	service center
16	communication network
18	photofinishing equipment
20	process monitoring device
22	computer
24	modem
26	service center computer
27	remote support technician
28	modem
30	quality management and reporting application
31	employee database
32	training summary reports
33	process control database
34	process control summary reports
35	customer feedback and contact management database
36	customer feedback summary reports
37	customer contact log reports
38	quality results database
39	quality results summary reports
40	operator training and testing application
42	color vision test module
43	employee identification
44	color vision test
45	inform employee of color vision deficiency step
46	inform employee of passing color vision test step
50	operator training and testing module
52	pre-test
54	display list of training module step
56	list of training modules

58 proceed through training step
59 final test
60 quality evaluation application
61 enter employee identification
63 entry of order ID step
64 request input on photographic quality step
65 collect input on imperfection type step
66 request input on physical quality step
67 collect input on type of physical defect
68 request input on clerical quality step
69 collect input on type of clerical imperfection step
70 customer feedback collection application
71 employee identification
73 entry of order ID step
74 request category of complaint step
75 request input on resolution of complaint step
76 request input on level of manager follow-up step
77 request customer contact information step
80 process control application
81 film process control strip
82 paper process control strip
83 feed data into process control database step
84 compare data with control limits step
85 return go indicator step
86 return no go indicator step
100 quality evaluation database
101 produce summary report step
103 produce individual retail site report step
110 operator training and testing database
111 produce summary report step
113 produce individual retail site reports step
120 customer feedback database

121 produce summary report step

123 produce individual retail site report step

130 process control database

131 produce summary report step

133 produce individual retail site report step